CLAIMS

1. A beam combiner/splitter apparatus, comprising:

a first array of optical fiber pairs;

a second array of optical fibers; and

an optical core interposed between the first and second arrays, wherein the optical core is configured to combine a plurality of pairs of orthogonally polarized beams of light into a plurality of dual-polarized combined beams of light, and wherein the optical core is configured to separate a plurality of dual-polarized combined beams into a plurality of pairs of orthogonally polarized beams.

2. A beam combiner/splitter apparatus as defined in claim 1, wherein the first array includes at least eight optical fiber pairs.

3. A beam combiner/splitter apparatus as defined in claim 1, wherein the optical fibers of the first array are polarization maintaining optical fibers, and wherein the optical fibers of the second array are single mode optical fibers.

4. A beam combiner/splitter apparatus as defined in claim 1, wherein the optical core is composed of a birefringent material.

5. A beam combiner/splitter apparatus as defined in claim 4, wherein the optical core is a single component.

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6. A beam combiner/splitter apparatus as defined in claim 4, wherein the optical core is composed of multiple pieces.

7. A beam combiner/splitter apparatus as defined in claim 6, wherein the multiple pieces of the optical core form a Wollaston prism.

8. A beam combiner/splitter apparatus as defined in claim 6, wherein one piece of the optical core is positioned for use by each of the optical fiber pairs of the first array.

9. A beam combiner/splitter apparatus as defined in claim 1, further comprising at least one collimating element.

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10. A method of combining a plurality of pairs of orthogonally plane-polarized beams of light, comprising:

by a first array of optical fiber pairs, collimating the plurality of pairs of orthogonally plane-polarized beams of light;

passing the plurality of pairs of beams through an optical core such that a second beam of each of the pairs of beams combines with a respective first beam of each of the pairs of beams to form a plurality of dual-polarized combined beams of light; and

receiving each of the plurality of combined beams into a respective optical fiber of a second array of optical fibers.

11. A method of combining as defined in claim 10, further comprising:

by the second array of optical fibers, collimating the plurality of combined beams.

12. A method of combining as defined in claim 10, wherein the optical core includes at least one component composed of a birefringent material.

13. A method of combining as defined in claim 10, wherein the plurality of pairs of beams are combined into the plurality of combined beams simultaneously.

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14. A method of separating a plurality of dual-polarized combined beams of light, comprising:

by a second array of optical fibers, collimating a plurality of dual-polarized combined beams of light;

passing the plurality of combined beams through an optical core such that the combined beams are separated into a plurality of pairs of orthogonally plane-polarized beams of light; and

receiving each of the plurality of pairs of beams into a respective pair of optical fibers of a first array of optical fiber pairs.

15. A method of separating as defined in claim 14, further comprising:

by the first array of optical fiber pairs, collimating the plurality of pairs of beams.

16. A method of separating as defined in claim 14, wherein the optical core includes at least one component composed of a birefringent material.

17. A method of separating as defined in claim 14, wherein the plurality of combined beams are separated into the plurality of pairs of beams simultaneously.

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18. A polarization beam combiner/splitter, comprising:

a first array of optical fiber pairs, each optical fiber pair having two optical fibers that are each optically coupled to a respective collimating element;

a second array of optical fibers, wherein each optical fiber includes a collimating element; and

an optical core composed of a birefringent material, the optical core being configured to receive a plurality of orthogonally plane-polarized beams of light from the first array and combine the orthogonally plane-polarized beams into a plurality of dual-polarized combined beams of light for receipt by the second array, wherein the optical core is further configured to receive a plurality of dual-polarized combined beams from the second array and separate the dual-polarized combined beams into a plurality of orthogonally plane-polarized beams of light for receipt by the first array.

19. A polarization beam combiner/splitter as defined in claim 18, wherein the optical core is composed of a single piece of birefringent material.

20. A polarization beam combiner/splitter as defined in claim 19, wherein the optical core includes a first and second planar faces that are oriented to perpendicularly receive light beams from the first and second arrays.

21. A polarization beam combiner/splitter as defined in claim 20, wherein the optical fibers of each optical fiber pair of the first array include slow axes that are aligned with the polarizations of the plurality of orthogonally plane-polarized beams of light that are received by the first array.

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22. A polarization beam combiner/splitter as defined in claim 21, wherein the collimating elements include collimating lenses.

23. A polarization beam combiner/splitter as defined in claim 22, wherein each collimating lens and respective optical fiber are coupled in a pigtail assembly.

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